UNIVERSITI PUTRA MALAYSIA

# WELFARE IMPACTS AND TRANSACTION COSTS OF FISHERIES CO-MANAGEMENT AT THE OXBOW LAKES (BAORS) IN BANGLADESH

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FEP 2000 9

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**By**

**KHONDKER MURSHED –E- JAHAN**

**Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy in the Faculty of Economics and Management Universiti Putra Malaysia**

**September 2000**

**DEDICATED**

To my father, mother, brothers, sister-in-law and late grandmother

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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**Chairman : Professor Dr. Nik Mustapha Raja Abdullah**
**Faculty : Economics and Management**

Fisheries co-management starts with the premise that stakeholders have the innate capacity to improve resource conditions as well as the welfare of the society. Recent investigations have shown that the co-management approach for governing natural resources can result in higher levels of productivity, and lower administration and enforcement costs than the national and centralized management approach. This suggests a need for rapid and substantial evaluation of fisheries management institutions. The main purpose of this study was to examine the economic performance of the fisheries co-management institution in the Oxbow Lake fisheries of Bangladesh. Firstly, this study examined net welfare change to society as a result of the introduction of a co-management system. Secondly, the resource rent and transaction costs analyses were used to evaluate the efficiency of the co-managed institution compared to the centralized management institution.

The simultaneous equation model consisting of supply, demand and identity equations were estimated and Marshallian surplus measurement was used to estimate

the welfare change with and without the co-management system. A cross- sectional heteroskedastic and timewise autoregressive model proposed by Kmenta (1986) was utilized for the estimation. The analysis showed that the co-management program had caused a welfare gain to society amounting to 1805186 Tk (USD 38989) from the original situation. Both consumers and producers gained by the project intervention, however, consumer welfare gain was bigger valued at 1762399 Tk (USD 38065) than that of producers valued at 42787 Tk (USD 924).

The Oxbow Lake co-management system had also resulted in higher rent of 19802 Tk/ha (USD 427 per ha), compared to the rent in government managed Lakes of 5652 Tk/ha (USD 122 per ha). The results also showed that return to capital and labor was also high in most of the co-managed Lakes compared to the government-managed Lakes.

Static and dynamic processes were utilized in this study to measure the transaction costs of fisheries management. The results presented in this thesis showed that transaction costs of managing the fisheries were lower under a co-management arrangement i.e. 2938 Tk/ha (USD 63 per ha) than the centralized management system of 4707 Tk/ha (USD 102 per ha).

The results from the analysis showed a better performance for the co-managed Lakes compared to the government-managed Lakes. The findings revealed that the lower transaction costs and higher resource rents are the result of the increased legitimacy inherent in the co-management system. This increased legitimacy encouraged fishers to develop cooperative approaches for effective management of the Oxbow Lakes.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

**IMPAK-IMPAK KEBAJIKAN DAN KOS-KOS URUSNIAGA BAGI PERNGURUSAN PERIKANAN SECARA BERSAMA DI TASIK OXBOW DI BANGLADESH.**

**Oleh**

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Pengurusan perikanan secara bersama berasas kepada andaian bahawa pemegang amanah harta (*stakeholders*) mempunyai keupayaan semulajadi untuk memperbaiki keadaan sumber dan juga kebajikan masyarakat. Kajian terbaru telah menunjukkan bahawa sistem pengurusan secara bersama mampu menjimatkan dari segi produktiviti, pentadbiran dan pelaksanaan berbanding dengan sistem pengurusan negara dan ber pusat. Oleh itu wujud keperluan pembentukan institusi pengurusan perikanan secara bersama dengan segera dan teguh bersama dengan proses-proses lain yang mungkin. Tujuan utama kajian ini ialah untuk mengkaji prestasi ekonomi institusi pengurusan perikanan secara bersama di kawasan perikanan Tasik Oxbow, Bangladesh. Pertama, kajian ini menilai kesan perubahan kebajikan bersih ke atas masyarakat hasil dari pengenalan sistem pengurusan bersama. Kedua, analisis sewa sumber dan kos urusniaga digunakan untuk menilai kecekapan institusi yang

diuruskan secara bersama berbandig dengan institusi perancangan pusat. Model persamaan serentak yang mengandungi persamaan penawaran, permintaan dan identiti di anggarkan dan ukuran lebihan Marshallian digunakan untuk menilai perubahan kebajikan dengan dan tanpa sistem pengurusan secara bersama.

Model keratan-lintang heteroskedastik dan autoregresif berunsurkan masa (*Time–wise*) yang dicadangkan oleh Kmenta (1986) digunakan bagi tujuan anggaran. Analisis menunjukkan bahawa projek pengurusan secara bersama telah menyumbang laba kebajikan kepada masyarakat berjumlah 1803709 Tk (USD 38957). Kedua-dua pengguna dan pengeluar menikmati laba hasil campurtangan projek, walaubagaimanapun, laba kebajikan pengguna adalah lebih besar iaitu 1752357 Tk (USD 37848) berbanding yang diperolehi oleh pengeluar sebanyak 51352 Tk (USD 1109).

Sistem pengurusan secara bersama Tasik Oxbow juga menghasilkan sewa ekonomi yang lebih tinggi iaitu 19802 Tk/ha (USD 427 per ha), berbanding dengan tasik yang diuruskan oleh kerajaan iaitu 5652 Tk/ha (USD 122 per ha). Hasil kajian juga menunjukkan bahawa pulangan modal dan buruh adalah tinggi di kebanyakkan tasik yang diuruskan secara bersama berbanding dengan tasik yang diuruskan oleh kerajaan.

Proses statik dan dinamik digunakan di dalam kajian ini untuk menilai kos urusniaga pengurusan perikanan. Hasil yang dikemukakan dalam kajian ini menunjukkan bahawa kos urusniaga bagi menguruskan perikanan adalah lebih murah di bawah sistem pengurusan secara bersama i.e. 2938 Tk/ha (USD 63 per ha) berbanding sistem pengurusan pusat pada 4707 Tk/ha (USD 102 per ha).

Penemuan yang wujud dari analisis menunjukkan prestasi yang lebih baik bagi sistem pengurusan secara bersama berbanding dengan sistem yang diuruskan oleh kerajaan. Hasil kajian mendedahkan bahawa kos urusniaga yang rendah dan sewa sumber yang tinggi adalah hasil dari peningkatan ligitimasi yang tersirat di dalam sistem pengurusan secara bersama. Peningkatan legitimasi ini mendorong nelayan-nelayan untuk membentuk sikap seragam yang diperlukan bagi pengurusan tasik Oxbow yang berkesan.

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Last but not the least I reserve my boundless gratitude to my parents, brothers and sister-in-law who always inspired and sacrificed a lot in the long process of building my academic career which can never be repaid.

I certify that an Examination Committee met on 14th September, 2000 to conduct the final examination of Khondker Murshed -e- Jahan on his Doctor of Philosophy thesis entitled "Welfare Impacts and Transaction Costs of Fisheries Co-Management at the Oxbow Lakes (Baors) In Bangladesh" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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## DECLARATION FORM

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| BBS | Bangladesh Bureau of Statistics |
| BKB | Bangladesh Krishi Bank |
| BRAC | Bangladesh Rural Advancement Committee |
| CPR | Common Property Regime |
| DANIDA | Danish International Development Agency |
| DOF | Directorate of Fisheries |
| EBSATA | East Bengal Acquisition and Tenancy Act |
| EEZ | Exclusive Economic Zone |
| FCSB | Fisheries Catch Statistics of Bangladesh |
| FFG | Fish Farming Group |
| FFYP | Fifth Five Year Plan |
| GOB | Government of Bangladesh |
| IDA | International Development Agency |
| IFAD | International Fund for Agricultural Development |
| LFT | Lake Fishing Team |
| LMG | Lake Management Group |
| MOL | Ministry of Land |
| OLSSFP | Oxbow Lake Small Scale Fishermen Project |
| OLP | Oxbow Lake Project |
| NFMP | New Fisheries Management Policy |
| NGO | Non Governmental Organization |
| PIU | Project Implementation Unit |
| TA | Technical Assistance |
| TFO | Thana Fisheries Officer |
| UNDP | United Nations Development Program |
| UNOPS | United Nations Office for Project Services |
| WB | World Bank |

# CHAPTER 1

# INTRODUCTION

Bangladesh is blessed with vast inland waters and abundant fisheries resources. Fish is a valuable natural resource in Bangladesh, which contributes significantly to the national economy. Fishery plays a major role in nutrition, employment and foreign exchange earnings. Fisheries account for about 3.27 percent of the country's GDP and contributes 60 percent of the nation's animal protein intake. Furthermore, it provides full time employment to about 1.2 million people and, also, part time employment to some 11 million people. About 10 percent of total export earnings come from this sector (FFYP, 1997). Fisheries sector in Bangladesh is believed to have tremendous potential for growth. According to World Bank (1991) fish production could grow at a rate as high as 4.5 percent per year in the next two decades through improvement in management and technology.

Fishery resources of Bangladesh operates under complex biological, technological, climatic, social, economic, political and institutional conditions (Ahsanullah, 1989). Until 1986 the basic mechanism for managing fishery resources in inland water bodies of Bangladesh had been based on the allocation of fishery rights through periodic leasing (one to three years). Usually, the lessee was a middleman who owned the exclusive rights to harvest fish in a water body, upon payment of a leasing fee to the government. The process was replicated through sub-leasing. These middleman hired fishers to catch fish. Fishers in need of fishing

grounds were required to pay these sub-leasing chain members (middlemen) to obtain their access. This system however had failed to serve the national interest of conserving the fisheries and protecting the economic fortune of the fishers (Aguero, 1989). The middlemen and wealthy private financiers are driven by self-interest to exploit the fishers at the cost of resource sustainability as well as the misery of the fishing community. As a consequence resource productivity have been reduced and the economic conditions of the fishers have deteriorated (Ahsanullah, 1989).

The realization of the above problem led the Bangladesh government to pursue a New Fisheries Management Policy (NFMP) in 1986 that opened up fisheries only to those who are directly engaged in fishing. The strategy of the NFMP was to gradually abolish the system of leasing water bodies to middlemen and to replace it with the licensing system in order to establish the access rights of genuine fishers (explained in section 1.2). Furthermore, it was expected that this system would help to develop a direct relation between the government and fishers with the aim to establish ultimately a partnership arrangement for resource management.

For the proper implementation of NFMP, two types of management options are being examined, namely the current centralized management system and a proposed co-management system. The economic performance of each of these management systems is yet to be addressed. In this study the societal welfare impacts in terms of resource rent generation and transaction costs of co-management system are evaluated and are compared with the centralized management system. This evaluation was carried out for Oxbow Lake Fisheries in the western part of Bangladesh.

## 1.1 Fishing Community in Bangladesh

In Bangladesh fisherfolk are classified into two groups, genuine fishers also known as a professional fishers or full time fishers and non-fishers or middlemen. The Department of fisheries, in its New Fisheries Management Policy (NFMP) defines a genuine fisher as one who devotes at least 9 months per year in fishing or gets 90 percent of his income from fishing. The Poverty oriented Bangladesh Rural Advancement Committee (BRAC) defines a genuine fisher as anybody who is directly engaged in fishing. In this study, for government managed Oxbow Lakes a genuine fisher is identified by the definition provided by NFMP. In co-management Lakes, the term genuine fishers is used for those who are directly engaged in fishing and owns up to 0.5 acre of land, or who earns an equivalent of or less than the income that can be derived from 0.5 acre of land (IFAD, DANIDA and UNOPS, 1994).

The fishing community in Bangladesh is made up mainly of Hindu fishers. However, with demographic changes and stagnation in agriculture, Muslims started to take up this trade (Taufique, 1995). Traditionally, Hindu fishers live in cluster homesteads in villages situated close to a water body. The official figure shows that the number of inland fishers in Bangladesh has increased from 650000 in 1972-73 to 768000 in 1988-89 (BBS, 1997).

In Bangladesh, genuine fishers constitute an underclass that is associated with landlessness and powerlessness, a prey to political bosses and exploitative credit

contracts by middlemen. Due to financial shortage and lack of credit facility, fishers are dependent on these middlemen who take a bigger share of their catch. These middlemen belong to rural power elites who, through their monopolistic control, exploit the fishers. The revenue oriented fishing policy, whereby fishers have little participation in decision making could hardly enjoy the benefits of common property. However, the difficult task of harvesting the fish is left to them.

## 1.2 Fisheries Resource System and Sector-Wise Contribution

Bangladesh, is the delta of major river systems originating from the Himalayas. Bangladesh, therefore is uniquely rich in water bodies. Apart from the near-shore Exclusive Economic Zone (EEZ) and the vast seas beyond, to which she has free access, Bangladesh possesses a wide range of water bodies, namely marshes, reservoirs, Lakes, natural depressions, rivers and estuaries that allow an extensive inland fishery. Covering an estimated total inland water area of 4.3 million hectare (Table 1.1) with nearly 277 fish species, this inland fishery provides significant livelihood opportunities for the people of Bangladesh (BBS, 1997).

Fish in Bangladesh comes mainly from two sources, inland and marine. The marine fisheries sector is categorized into industrial (trawl) and artisanal types, while the inland fisheries is classified into two broad categories, capture (also called open) and culture (also called closed) fishery. The term capture fishery is used to refer to the harvesting of fish and prawn populations that are self-reproducing and self-sustaining in inland open water systems. On the other hand, the growing of fish in

confined bodies of water like ponds and Oxbow Lakes through aquaculture operations is called culture fishery. The different components of capture fisheries are river (including estuaries), canals, flood plains, beels (natural depressions), and Kaptai Lake (it was formed by the creation of a dam across the river Karnaphuli in the southeastern district of Chittagong). On the other hand close water habitats are coastal brackish water ponds and Oxbow Lakes. Of the total areas of inland water bodies, culture fisheries cover 6.7 percent while the rest is covered by capture fishery (Table 1.1).

Table 1.1: Inland Fisheries Areas in Bangladesh, 1997

| Fishery Types | Area ( hectare) |
|---|---|
| Rivers & Estuaries | 1031563 |
| Beels | 114161 |
| Kaptai Lakes | 68800 |
| Flood Lands | 2832792 |
| Total Capture Fisheries | 40473316 (93.3%)* |
| Oxbow Lakes (Baors) | 5488 |
| Ponds | 146890 |
| Coastal Aquaculture | 137996 |
| Total Culture Fisheries | 290374 (6.7%)* |
| Inland Total | 4337690 |

Source: Bangladesh Bureau of statistics (BBS), 1997.
Note: * Figure in the Parenthesis indicate Percentage share of total Inland Water

Although only 6.7 percent of the area is covered by culture fishery, its contribution to total fish production is significantly higher than capture fishery which covers almost 94 percent of the total inland water areas (Table 1.2). In 1996-97 about 30 percent of the total fish production came from culture fishery, 48 percent from capture fishery and the rest from marine. The share of fish from culture fishery increased from 23.5 percent in 1990-91 to 30 percent in 1996-97. During this period the share of capture and marine fishery decreased from 49.5 percent to 48.03 percent